CubeSat Compatible, Rad-Hard, Long Lifetime, Miniature Integrated Star Tracker (MIST), Phase I

Completed Technology Project (2018 - 2019)

Project Introduction

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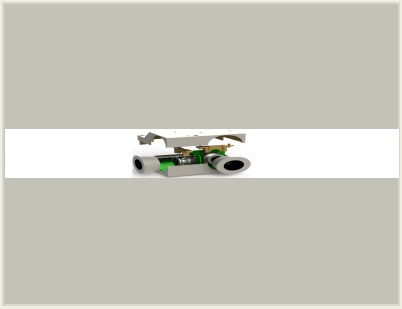
Anticipated Benefits

Space Micro has a strong record of commercializing the results of SBIR funded projects. We are a product focused company with excellent sales representatives in every part of the country. We have an efficient approach for commercialization that begins with offering products early in their development cycle and getting as much customer feedback as possible to steer the development. The technology proposed here has a very good probability of reaching a mature product state since it will be implemented as a companion product to our uSTAR line already accepted in the industry. The small size and low power performance of the MIST will be attractive to cubesat and deep space missions. The cross-cutting space product evolving from this SBIR has the potential to add value to and enable many potential NASA space missions. Some of these future NASA missions include Lucy, Psyche, IXPE, Restore, Hermes, Whipple, TiME, Hera, Chopper, etc. which encompass both Discovery-class and SMEX missions. The customers for the system includes NASA centers that design and build their own spacecraft as well as the spacecraft prime contractors and with the small size and low power this product can also be provided to small businesses and university cubesat providers. Space Micro has worked with most of the satellite prime companies and also the NASA centers

While the product form factor can be for 3U or 6U CubeSat designs, our core subsystems can be used in a variety of configurations for small and large spacecraft. With 100krad (Si) parts that can survive up to 15 year LEO, GEO, or deep space missions, this product has potential for many NASA sponsored spacecraft. Space Micro will manufacture and market this product to potential NASA customers and as the design verification is completed during our Phase II SBIR effort, the spacecraft primes e.g. (LM, Boeing, Orbital ATK, Northrop Grumman, Ball, SNC, etc.) will be more comfortable with the high TRL. The space product evolving from this SBIR can be scaled both in size and parts grade to accommodate a wide range of customers. Of particular interest, is the emerging commercial constellations for space-based Internet service and Earth observation data. Space Micro has worked closely with the several of these emerging commercial entities (Google, WorldVu, SpaceX, etc. to define their requirements and scale our electronic subsystems to meet their unique needs. There are also a number of DoD space mission applications for small satellites, including those capable to surviving an electric propulsion transfer from LEO to GEO or continuous operation of 15 years in GEO. Space Situational Awareness (SSA) applications have become a topic of great interest to the DoD. International space programs (ESA, ISRO, JAXA, etc.) are also potential customers, subject to export control and ITAR.



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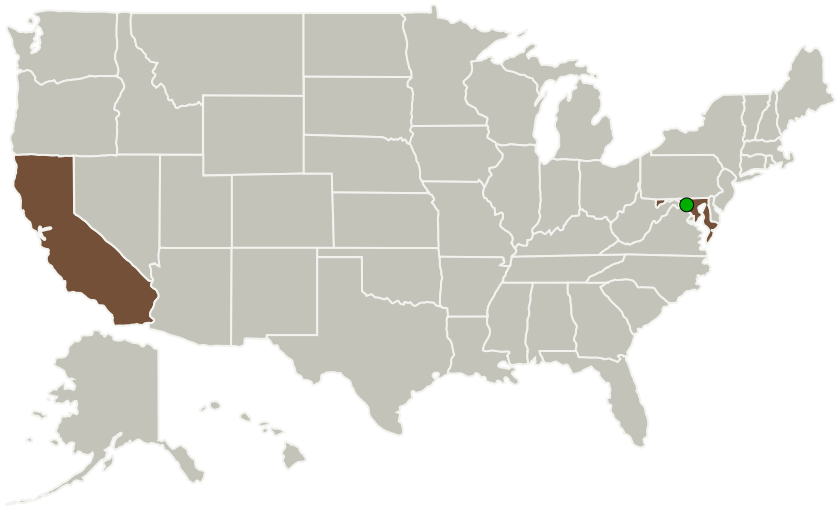
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Space Micro, Inc.	Lead Organization	Industry	San Diego, California
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Transitions

July 2018: Project Start

February 2019: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/141320)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Space Micro, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

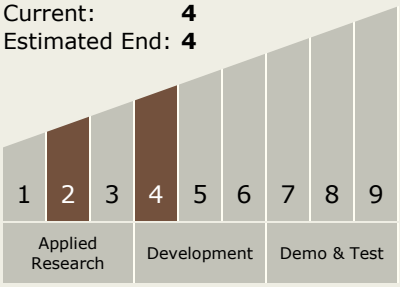
Carlos Torrez

Principal Investigator:

Michael Jacox

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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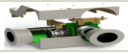
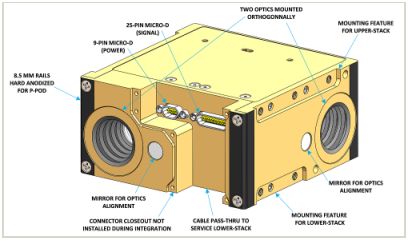
Images



Briefing Chart Image
CubeSat Compatible, Rad-Hard, Long Lifetime, Miniature Integrated Star Tracker (MIST), Phase I
(https://techport.nasa.gov/image/129522)



Final Summary Chart Image
CubeSat Compatible, Rad-Hard, Long Lifetime, Miniature Integrated Star Tracker (MIST), Phase I
(https://techport.nasa.gov/image/136237)

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.3 Internetworking
    - TX05.3.1 Disruption Tolerant Networking

Target Destinations

Earth, The Moon, Mars, Others Inside the Solar System